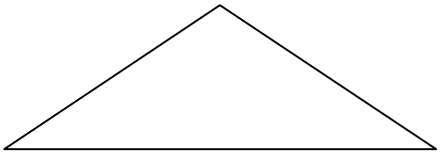
## 7.2 Law of Sines

Today we will discuss triangles that are NOT right triangles – oblique triangles.

Naming sides & angles



$$\frac{\sin\alpha}{a} = \frac{\sin\beta}{b} = \frac{\sin\gamma}{c} \quad \text{OR} \quad \frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

(Use when you know 2 angles and one side or when you know two sides and an angle that is not in between those two sides)

Use for: AAS, ASA, SSA

Draw picture for each of these:

The first two cases are easy to solve using Law of Sines

Topic 7.2.1a/ question #116
1) In triangle ABC, find c if $\alpha = 45°$, $\gamma = 20°$, $a = 3$.

2) ) In triangle ABC, find c if $\alpha = 45°$, $\gamma = 20°$, $b = 3$. . (ASA can easily become AAS)

Word Problems

Topic 7.2.1b/ question #118

1) The angle of depression from a balloon to two points A and B on level ground are 55° and 23°, respectively. Points A and B are 12 miles apart and the balloon is between the points, in the same vertical plane. Find the distance in miles between the balloon and the point B.

2)The angle of elevation of a balloon from two points A and B on level ground are 55° and 23°, respectively. Points A and B are 12 miles apart and the balloon is between the points, in the same vertical plane. Find the distance in miles between the balloon and the point B.

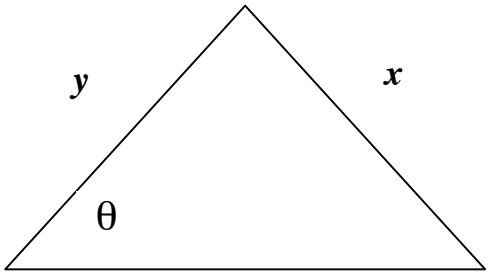
3)Two points A and B are located on opposite sides of a river. Point C is located 80 yard from B, on the same side of the river as B. In triangle ABC, if angle ABC is 59° and angle ACB is 64°, find the distance in yards between A and C.

4)A fire at C is spotted by fire lookout stations A and B. If angle CBA is 15° and angle CAB is 95°, how far apart are the two stations, if the distance between station A and the fire is 10 miles?

Topic 7.2.1d/question #119

The ambiguous case: SSA

You can label your triangle with the letters given in a certain problem later. For now we need to see the dimensions given as a side (call is ***x***) & the angle opposite that side (call it θ) and another side (call it ***y***).




Compare x and y.

1) If $x \geq y$, then there is one triangle.
2) Otherwise, find $h = y\sin\theta$.
    a) if $x < h = y\sin\theta$, then there is NO triangle
    b) if $x = h = y\sin\theta$, then there is ONE triangle
    c) if $x > h = y\sin\theta$, then there are TWO triangles.

Now let's some of topic 7.2.1b/ question #117